Abstract:

The Women and Child Safety Alert System is a comprehensive security solution that integrates multiple technologies, including GSM, GPS, Raspberry Pi, accelerometer, microphone, camera, buzzer, touch sensor and a panic button, to ensure real-time safety. The system is designed to address emergency situations by sending location-based alerts, audio and visual evidence, and fall detection notifications to predefined contacts. A mobile app further enhances safety by enabling real-time monitoring, communication, and location tracking. This project aims to provide a reliable, fast, and easy-to-use solution for improving personal security, especially for women and children, in dangerous or emergency scenarios.

Objectives:

Real-Time Emergency Response: To develop a system that sends instant alerts (SMS and calls) to predefined contacts, along with the user's real-time GPS location, in case of emergencies.

Audio and Visual Monitoring: To capture and transmit audio (via microphone) and visual data (via camera) to aid in assessing the user's situation during an emergency.

Fall Detection Mechanism: To automatically detect a fall or an impact and trigger alerts without user intervention.

Touch-Based Interaction: To integrate a touch sensor for detecting unwanted physical contact or tampering and trigger alerts.

Mobile App Interface: To allow real-time tracking, communication, and monitoring through a mobile app, ensuring immediate response from emergency contacts.

Existing methods and drawbacks:

Mobile Safety App:

Methods: Existing mobile apps provide features such as sending SMS alerts, location sharing, and calling emergency contacts.

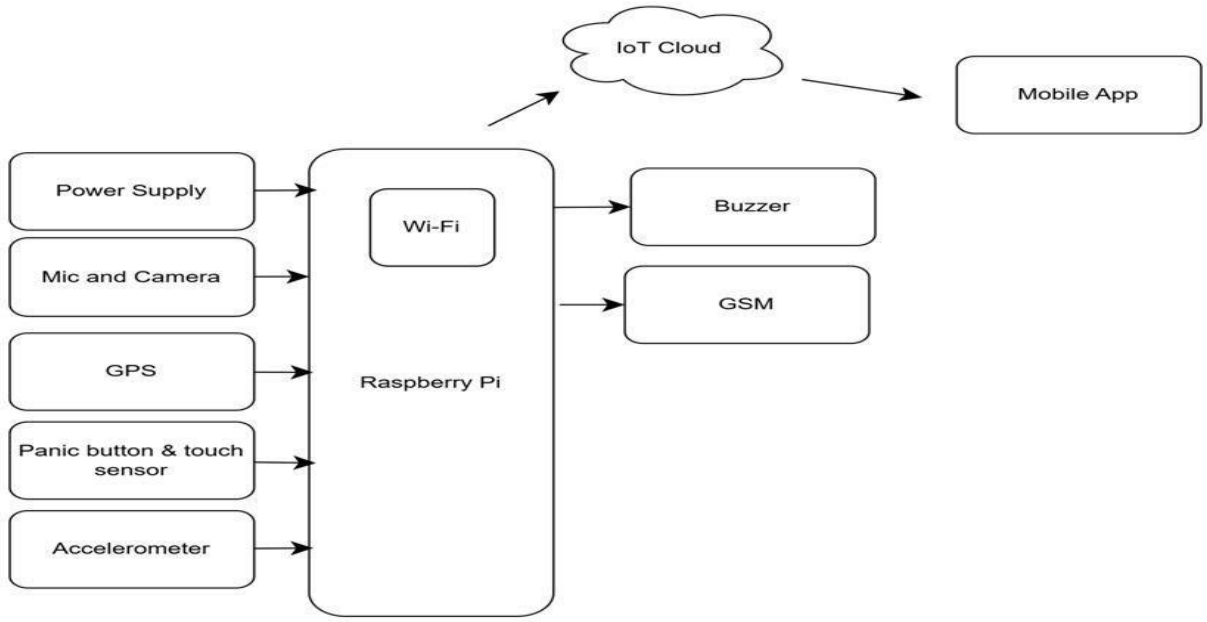
Drawbacks: These apps require manual operation and user intervention, which might not be feasible during an immediate crisis. Additionally, they lack advanced features like fall detection and real-time video capture.

Wearable Safety Devices:

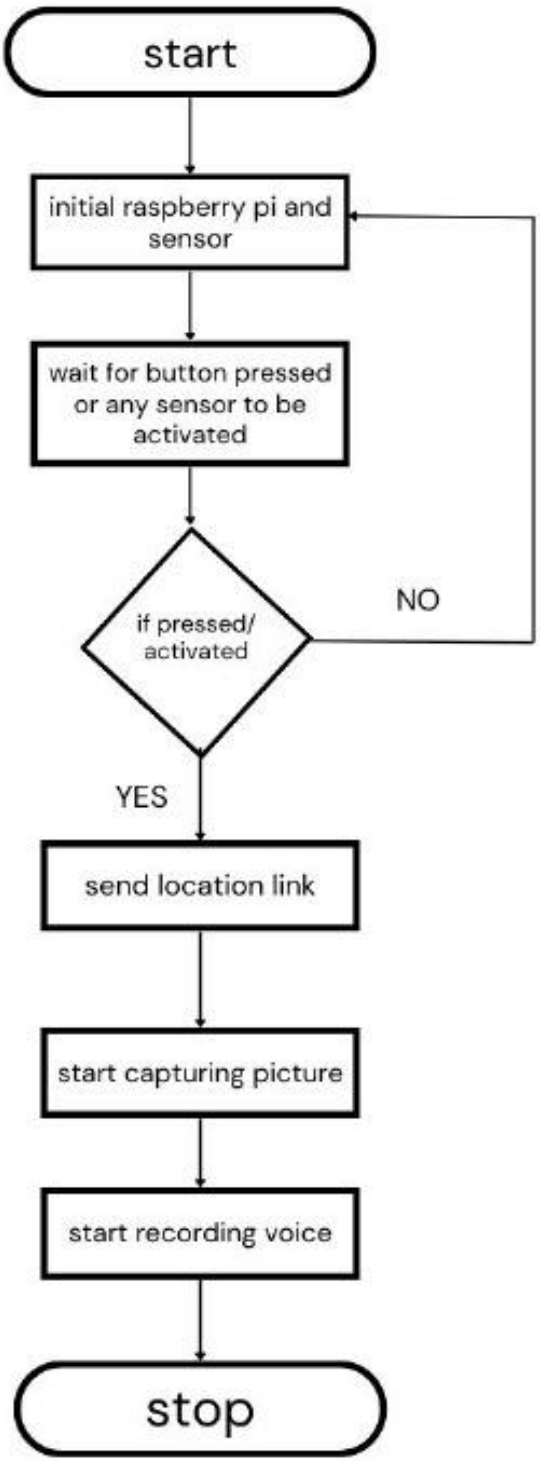
Methods: Wearable devices often include GPS tracking and panic buttons.

Drawbacks: Limited to sending location data, these devices lack integration with cameras, microphones, and fall detection, providing incomplete safety measures.

Proposed system block diagram:



Flow chart:


start
initial raspberry pi and sensor
wait for button pressed or any sensor to be activated
if pressed/ activated
NO
YES
send location link
start capturing picture
start recording voice
stop

Proposed system description:

System Initialization: The user carries or wears the device (with Raspberry Pi, sensors, and modules).

Panic Button Press: In an emergency, the user presses the panic button, which triggers the system to perform the following actions:

Captures the user's GPS location. Sends an SMS alert with the location to emergency contacts .Captures photos using the camera and sends them via the app.

Initiates a phone call to alert emergency contacts.

Fall Detection: If the accelerometer detects a fall, the system automatically triggers an alert and follows the same flow of location sharing, messaging, and calling.

Touch Sensor Activation: If the touch sensor is triggered, indicating an unwanted interaction, the system sends an alert.

GSM Communication: The GSM module handles the messaging and calling functions to notify contacts.

Mobile App Interface: Emergency contacts can track the user's location, receive real-time images, and access any recorded audio or video footage through the mobile app.

Advantages:

Women's Personal Safety: Ideal for women in vulnerable situations, allowing them to quickly trigger alerts and notify their family or authorities.

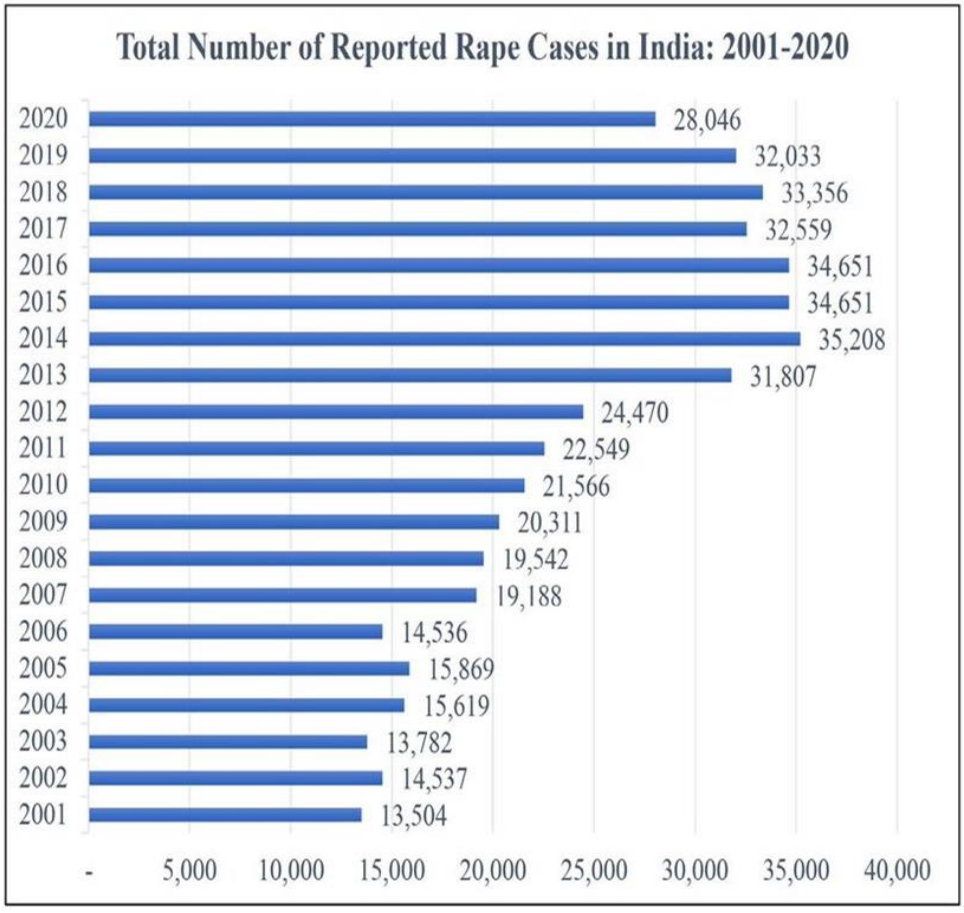
Child Safety Monitoring: Can be used by parents to track the location of children and receive alerts in case of emergencies or suspicious interactions.

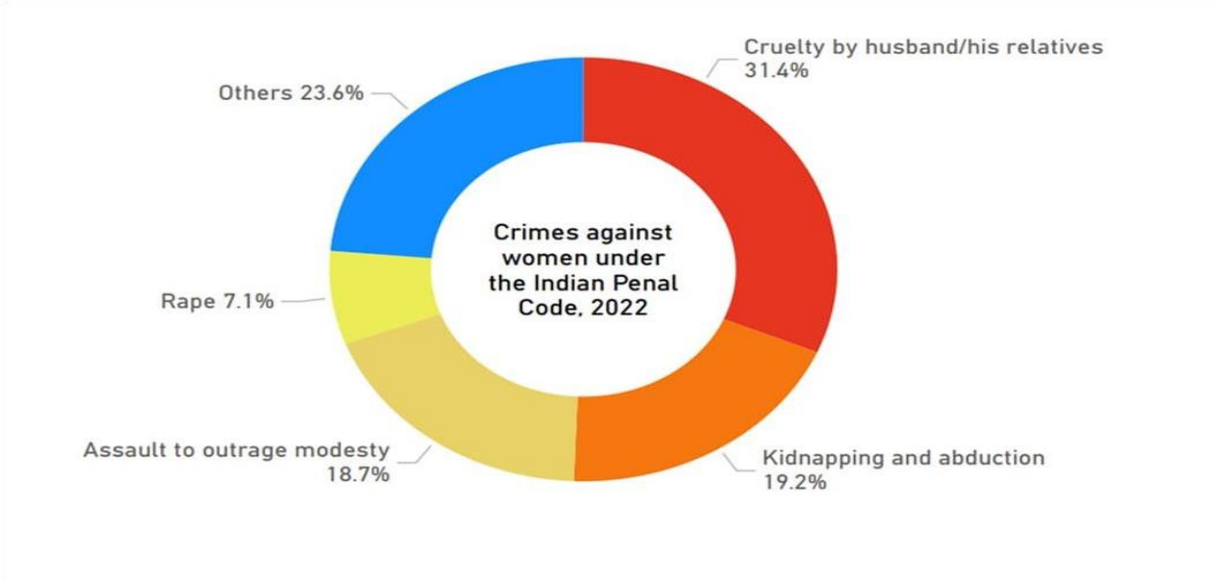
Elderly Care: The fall detection feature makes it useful for elderly individuals living alone, automatically notifying caregivers in case of accidents.

Security for Outdoor Workers : Ideal for workers in isolated or dangerous environments, ensuring help can be quickly dispatched in case of accidents or threats.

Travel Safety : Useful for travelers in unfamiliar places, providing real-time location sharing and monitoring during their trips.

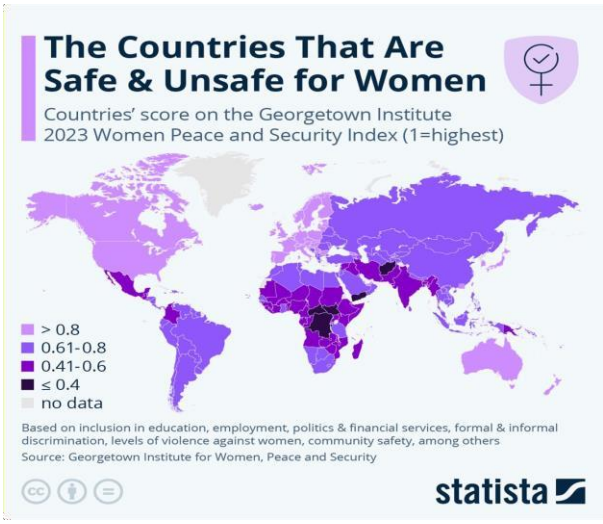
Data based on surveys and reports of world organization's:

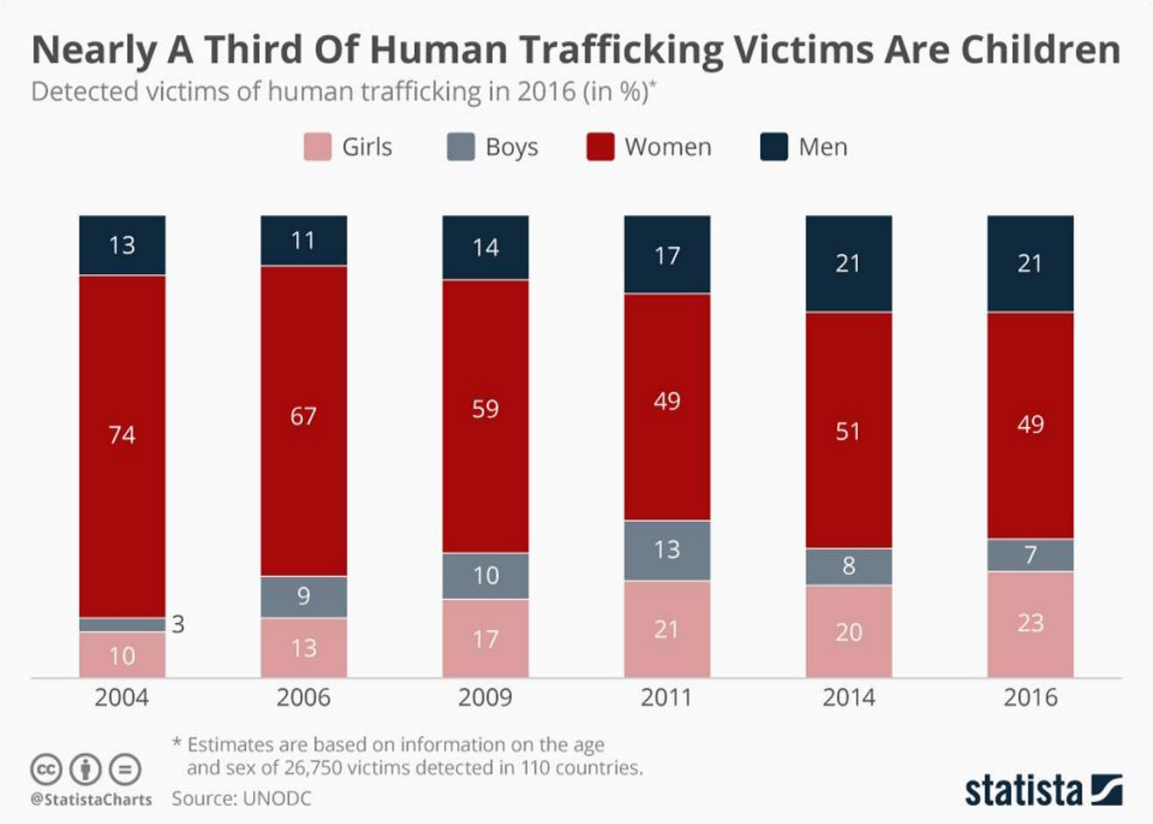




The majority of crimes against women under the Indian Penal Code were of cruelty by the husband or his relatives (31.4 per cent). This was followed by kidnapping and abduction of women (19.2 per cent), assault on women with intent to outrage her modesty (18.7 per cent), and rape (7.1 per cent), NCRB records state.

Globally too, Violence Against Women and Girls (VAWG) is a serious and pervasive issue. According to the World Health Organization, at least one in three women worldwide has experienced physical or sexual violence in their lifetime, and nearly one in 10 girls has experienced forced intercourse or other sexual acts.Fifteen million adolescent girls worldwide, aged 15–19 years, have experienced forced sex. In the vast majority of countries, adolescent girls are most at risk of forced sex (forced sexual intercourse or other sexual acts) by a current or former husband, partner, or boyfriend. Based on data from 30 countries, only 1 per cent have ever sought professional help.





Child trafficking is a global crisis affecting millions of children each year, with an estimated 1.2 million children trafficked annually for exploitation in forced labor, sexual exploitation, child soldiering, and forced begging. According to UNICEF, one in four victims of human trafficking worldwide is a child, with the rates being even higher in regions like Africa and Southeast Asia. Poverty, social inequality, lack of education, and political instability increase children's vulnerability to traffickers, who often target disadvantaged communities. The effects on trafficked children are profound, leading to long-lasting physical, psychological, and social harm. Despite international protocols and efforts to combat trafficking, enforcement challenges and underreporting make it difficult to eliminate. Addressing child trafficking requires coordinated efforts across borders, stricter law enforcement, and support services for survivors

In 2020, for every 10 victims of human trafficking detected globally, about four were adult women and about two were girls. Most of the detected victims of trafficking for sexual exploitation (91 per cent) are women. Analysis of court cases shows that female victims are subjected to physical or extreme violence at the hands of traffickers at a rate three times higher than males.

Research papers:

WOMEN SAFETY: AN INDIAN PERSPECTIVE

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ABSTRACT:

In the Indian modern country is fast emerging as a global power but for half of its population, the women across the country, struggle to live life with dignity continues. Women, irrespective of their class, caste andeducational status, are not safe In the modern society women have been the victims of exploitations since long time in different fields in their life both physically, socially, mentally and economically. There are several causes of sexual as well as moral abuse which are very often highlighted by the media in Indian modern society, and a lot of those also remain unexplored. Although, such violence against women, sexual harassment and exploitation to women is not of recent origin, its trace is found in the history of ancient India. Women are facing problems in every sphere of life whether employment, access to health care or property rights. India is fast developing but women's in India continue to be discriminated.

Although a lot of women safety systems are already available in the market but still a more sophisticated system is required to provide more safety and security. Thus till now the

INTRODUCTION:

Women safety is a very big concern in a country like INDIA where women are playing an outstanding role in each and every field.

Indian woman bearing the torch of cultured living through self-sacrifice, physical and mental endurance. In the 21st century India is fast emerging as a global power but for half of its population, the women across the country, struggle to live life with dignity continues. Women are facing problems in every sphere of life whether employment, access to health care or property rights. Women may be have stardom in any stream but are getting harassment every day by their surroundings. They are victims of crime directed specifically at them, rape, kidnapping and abduction, dowry-related crimes, molestation, sexual harassment, eve-teasing, etc. Women, irrespective of their class, caste and educational status, are not safe. The lack of any serious effort to rectify the weaknesses in dealing with the crimes against women further.

OBJECTIVES:

1. We have selected this topic because to discuss about the problem faced by women in their day to day life.
2. There are some issue such as crime against women, gender based violence, gender based discrimination within the household or at workplace, prenatal sex discernment and female feticide, female infanticide, childhood physical and sexual abuse, dowry harassment and deaths.
3. Earlier time women empowerment where not given importance.
4. Some of them have been the victim of above problems but then too they are silent and this is the major drawback.

METHODOLOGY:

The research has used data collected from primary data collection methods. For the purpose of the research, a structured survey questionnaire was created containing both close and open ended questions. Categories of school-going, college students, working and non-working were created. The sample size was 117 respondents out of which 41.03% were male and 58.97% were female.

REVIEW OF LITERATURE:

The principle of gender equality isenshrined in the Indian Constitution in its Preamble, Fundamental Rights, Fundamental Duties and DirectivePrinciples. The Constitution not only

grantsequality to women, but also empowers the State to adopt measures of positive discrimination in favor of women.

India has also ratified various international conventions and human rights instruments committing to secure equal rights of women. Key among them is the ratification of the Convention on Elimination of All Forms of Discrimination Against Women (CEDAW) in 1993.

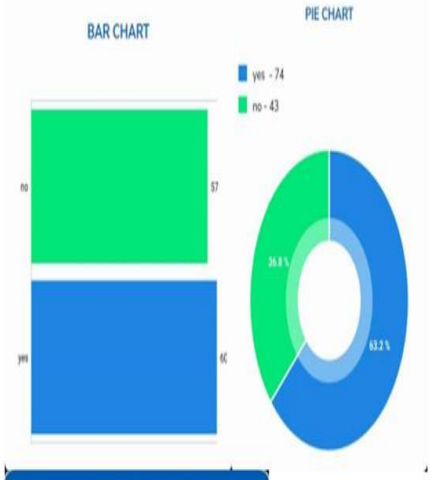
FINDINGS/ANALYSIS:

The status of women in India has gone through many great changes over the past few millennia. From equal status with men in ancient times through the low points of the medieval period to the promotion of equal rights by many reformers, the history of women in India has been eventful. In modern India, women have adorned high offices in India including that of the President, Prime Minister, Leader of the Opposition and Speaker of the Lok Sabha. However, women in India continue to face social challenges and are often victims of abuse and violent crime.

According to our research among urban population in India, 51.28% feel that women are safe to travel by local transport while 93.16% feel women are not the weaker gender, 63.25% feel that a daughter carries the legacy of the family and 95.73% do not support dowry. 64.96% feel women get equal opportunity at work/home. While 65.81% feel safe to speak out about abuse faced by women only 63.25% feel safe to approach police to report abuse faced by women. While 41.88% feel that a woman's attire does not contribute to their feeling of safety. 79.49% of women face abuses which include purse/chain snatching, eve teasing, road rage and groping.

DATA ANALYSIS:

Do you feel women are safe to travel by local transport ?



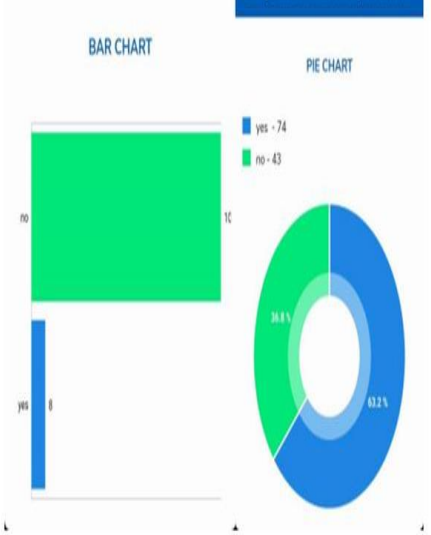
Do you feel safe to approach police to report abuse faced by women?

Are you aware of various acts protecting the rights of women?

RESULTS

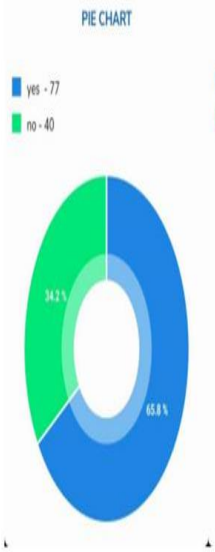
Options	%	Count
The prohibition of child marria...	29.06	34
Special marriage act 1954	3.42	4
Dowry prohibition act ...	17.09	20
Indian divorce act 1969	4.27	5
Sexual harassment of ...	**42.74**	50
Maternity benefit act 1861	3.42	4

Do you feel women are weaker gender than men?

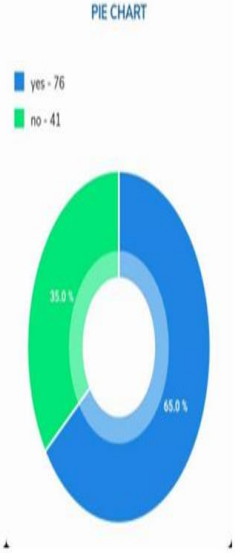


Do you feel safe to approach police to report abuse faced by women?

Do you feel safe to speak out about abused faced by women?



Do you feel women have equal opportunity at work/ house ?



CONCLUSION:

In this project we were able to critically analyse the safety of women in public areas, work places, etc. In modern India, even though majority of people respect women and stand with them to stop the crime they suffer, women still face judgement and other discrimination in society. While the government is doing great work by supporting the empowerment of women with its various schemes that will help for betterment for women, a lot has to change at the rural level where women are far from being considered equal to men with the basic right like education too being denied to them.

In the current scenario, there is an increasing need to spread more awareness regarding women's safety laws and policies in our nation. Also, like the saying, 'You don't need a saviour when you can defend yourself', the best help a woman can get is when she learns to protect herself by being educated to learning martial arts and the feeling that women should enjoy equal opportunities should be inculcated from a young age be it a girl or boy, only then can we create a safe society where women are considered equal.

REFERENCES:

1. 1.**Arpita Banerjee (2013) "Status Of Women and gender discrimination in India" International journal of development research Vol 3 Issue 2 PP. 057-064**

- This paper has tried to evaluate the status of women and its position in the light of several important gender related development indicators.
- Analysis of each indicator separately has helped to identify the state's progress and backwardness in respect of each particular indicator.

2. **Dr. (Ms.) Rekha Singh (2004) " Status Of Women in Indian society" Trustees Of Boston University**

- Through this exploration we have fined that as the time changes women's rights likewise have experienced wide changes. Indian women have aced everything without exception which a lady International Journal of Pure and Applied Mathematics Special Issue 4871 can dream of. In any case, despite everything she needs to go far to accomplish square with status in the psyches of Indian men.

3. **Dr. Rajeshwari.M. Shettar (2015) "A study on issues and challenges of women empowerment in India" IOSR-JBM vol 17 issue 4**

- This paper attempts to analyze the status of Women Empowerment in India and highlights the Issues and Challenges of Women Empowerment. Today the empowerment of women has become one of the most important concerns of 21st century.

Components used:

Raspberry Pi

Accelerometer

GSM module

GPS module

Camera

Microphone

Panic Button

Touch sensor

Buzzer

Budget Breakdown:

Component	Quantity	Cost per Unit	Total Cost (in Rs)
Raspberry pi	1	4000.00	4000.00
Gsm	1	1000.00	1000.00
Gps	1	500.00	500.00
Power supply	1	900.00	900.00
Memory card	1	200.00	200.00

Max30102 spo2 sensor	1	400.00	400.00
Gsm module	1	500.00	500
Total Estimated Budget			**7500.00**

Code:

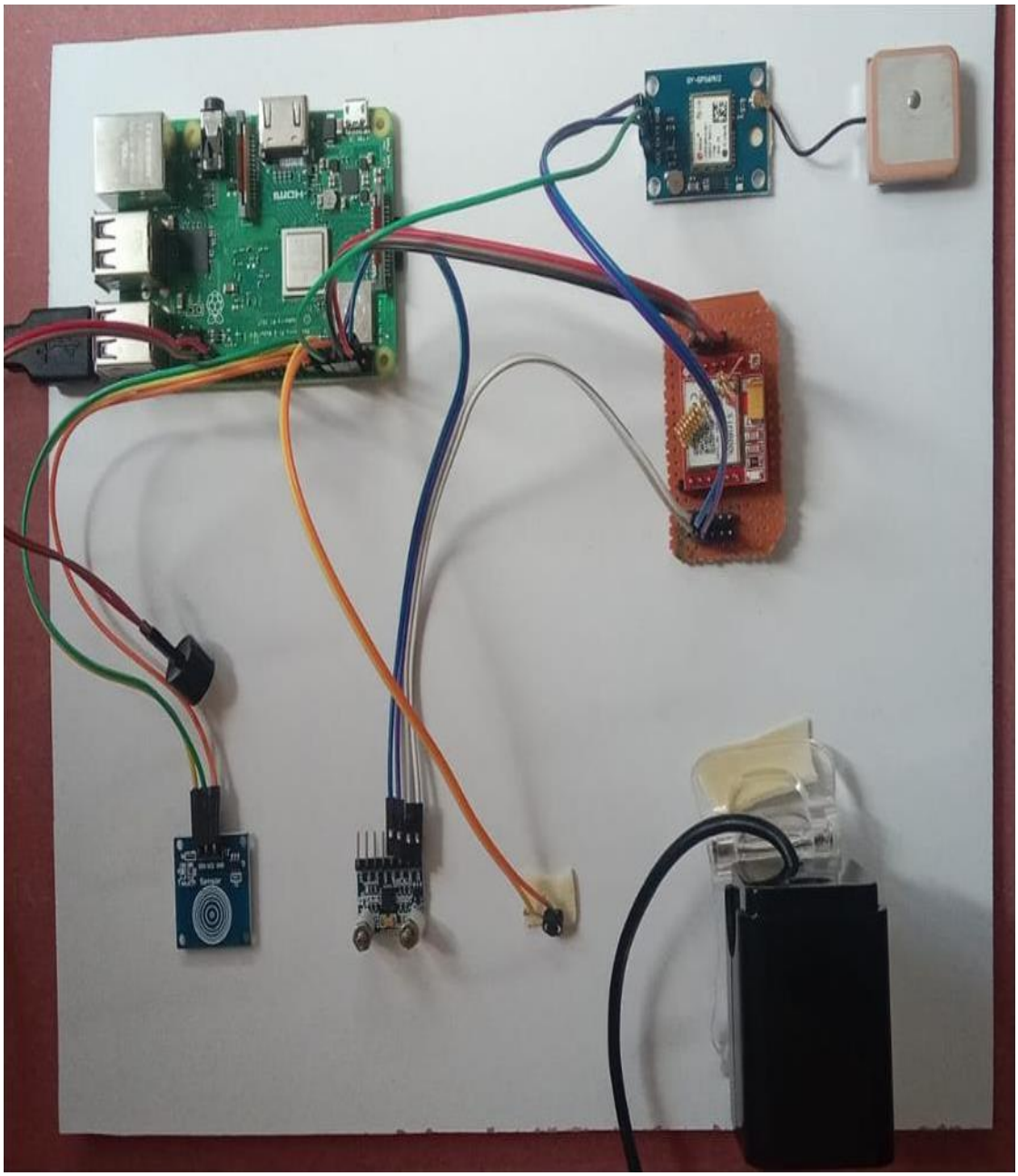
```
import os
import sys
import RPi.GPIO as  GPIO
from time import sleep
import time
import urllib.request
from time import sleep
import serial
import webbrowser
import cv2
import smbus
import time
import telepot
import sounddevice as sd
import soundfile as sf
# MPU6050 Registers and Address
MPU6050_ADDR = 0x68
PWR_MGMT_1 = 0x6B
ACCEL_XOUT_H = 0x3B
GYRO_XOUT_H = 0x43

# Initialize the I2C bus
bus = smbus.SMBus(1)

# Wake up the MPU6050 (it starts in sleep mode)
bus.write_byte_data(MPU6050_ADDR, PWR_MGMT_1, 0)
BOT_TOKEN = '7959467624:AAEOp5ST9WknFrXpGLpxU-31sXxhkDnJcIQ'
CHAT_ID = '6823870727'

def handle(msg):
  global telegramText
  global chat_id
  global receiveTelegramMessage

  chat_id = msg['chat']['id']
  telegramText = msg['text']

  print("Message received from " + str(chat_id))

def capture():

    print("Sending photo to " + str(chat_id))
    bot.sendPhoto(chat_id, photo = open('./image.jpg', 'rb'))


bot = telepot.Bot('7959467624:AAEOp5ST9WknFrXpGLpxU-31sXxhkDnJcIQ')
chat_id='6823870727'
bot.message_loop(handle)

print("Telegram bot is ready")

bot.sendMessage(chat_id, 'BOT STARTED')
```

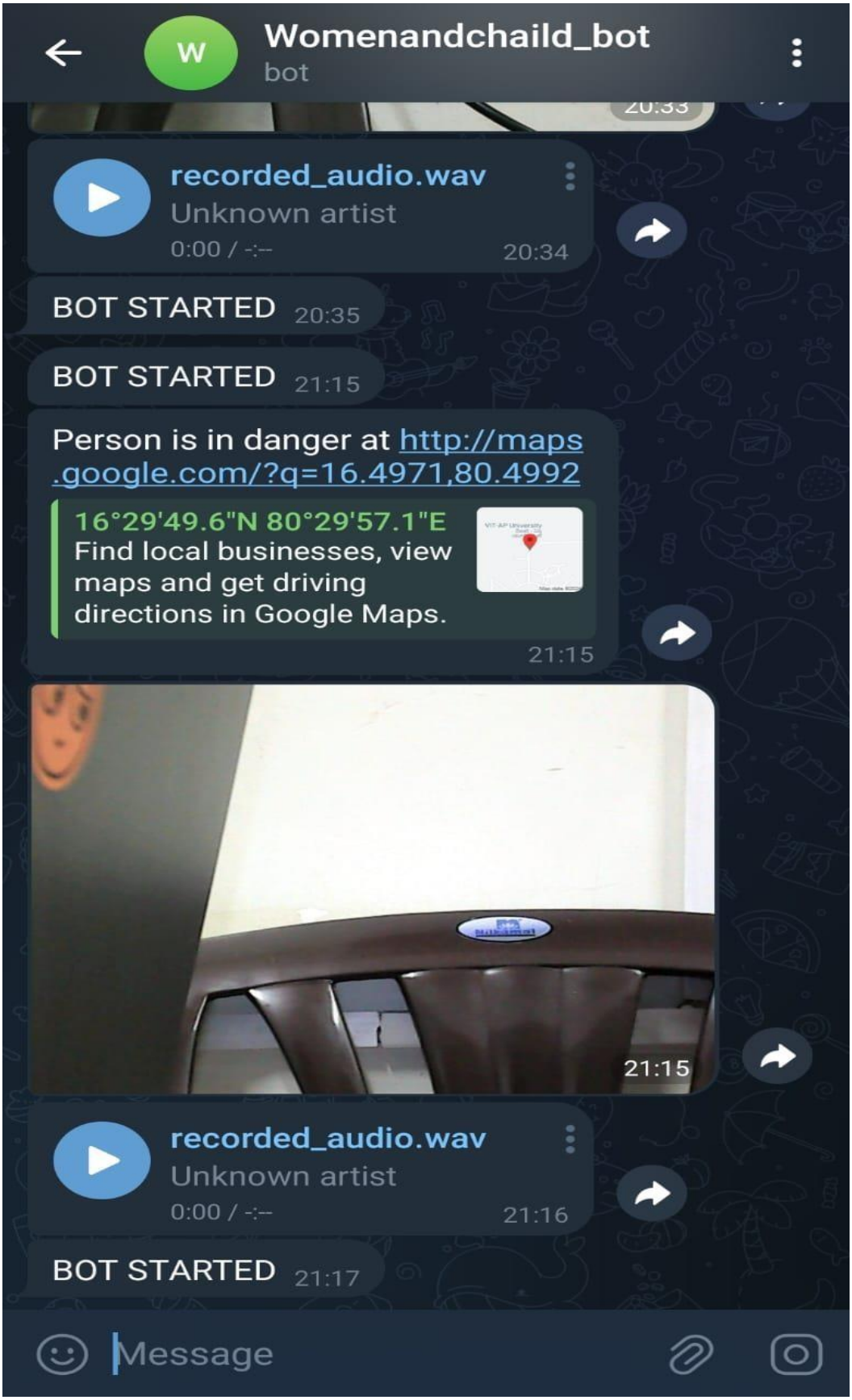
```
def record_audio(duration, filename):
    print("Recording...")
    # Set the audio format
    sample_rate = 44100
    channels = 2

    # Record audio
    audio_data = sd.rec(int(duration * sample_rate), samplerate=sample_rate, channels=channels)
    sd.wait()

    # Save audio to a file
    sf.write(filename, audio_data, sample_rate)

def send_audio_to_telegram(token, chat_id, audio_file):
    print("Sending audio to Telegram...")
    bot = telepot.Bot(token)

    with open(audio_file, 'rb') as audio:
        bot.sendAudio(chat_id, audio)


def read_raw_data(addr):
    # Read two bytes of data from a given address
    high = bus.read_byte_data(MPU6050_ADDR, addr)
    low = bus.read_byte_data(MPU6050_ADDR, addr + 1)
    # Concatenate higher and lower values
    value = (high << 8) | low
    # Convert to signed
    if value > 32768:
        value = value - 65536
    return value
GPIO.setwarnings(False)
GPIO.setmode(GPIO.BCM)

ts=17
pb=4
buz=26




def GPS_Info():
    global NMEA_buff
    global lat_in_degrees
    global long_in_degrees
    nmea_time = []
    nmea_latitude = []
    nmea_longitude = []
    nmea_time = NMEA_buff[0]                    #extract time from GPGGA string


    nmea_latitude = NMEA_buff[1]                #extract latitude from GPGGA string
    nmea_longitude = NMEA_buff[3]               #extract longitude from GPGGA string

    #print("NMEA Time: ", nmea_time,'\n')
    #print ("NMEA Latitude:", nmea_latitude,"NMEA Longitude:", nmea_longitude,'\n')
    try:
        lat = float(nmea_latitude)                  #convert string into float for calculation
        longi = float(nmea_longitude)               #convertr string into float for calculation
    except:
        lat=0
        longi=0
    lat_in_degrees = convert_to_degrees(lat)    #get latitude in degree decimal format
    long_in_degrees = convert_to_degrees(longi) #get longitude in degree decimal format


def send_sms():
    global map_link
    print("sending SMS..")

    cmd='AT\r\n'
    ser.write(cmd.encode())
    time.sleep(2)
    rcv = ser.read(20)
    print(rcv)
    cmd='AT+CMGF=1\r\n'
    ser.write(cmd.encode())
    time.sleep(2)
    rcv = ser.read(20)
    print(rcv)
    phno="9392082493"


    cmd='AT+CMGS="'+str(phno)+'"\r\n'
    ser.write(cmd.encode())
    rcv = ser.read(20)
    print(rcv)
    time.sleep(1)
    cmd="women is in danger at"
    ser.write(cmd.encode())  # Message
    cmd=map_link
    ser.write(cmd.encode())  # Message
    #ser.write(msg.encode())  # Message
    time.sleep(1)
    cmd = "\x1A"
    ser.write(cmd.encode()) # Enable to send SMS
    time.sleep(10)
    print('SMS Sent')
    time.sleep(5)

    cmd='ATD'+str(phno)+'";\r\n'
    ser.write(cmd.encode())
    rcv = ser.read(20)
```

```
    time.sleep(5)

def convert_to_degrees(raw_value):
    decimal_value = raw_value/100.00
    degrees = int(decimal_value)
    mm_mmmm = (decimal_value - int(decimal_value))/0.6
    position = degrees + mm_mmmm
    position = "%.4f" %(position)
    return position


gpgga_info = "$GPGGA,"
ser = serial.Serial ("/dev/ttyS0",timeout=0.1)             #Open port with baud rate
GPGGA_buffer = 0
NMEA_buff = 0
lat_in_degrees = 0
long_in_degrees = 0


GPIO.setup(ts, GPIO.IN, GPIO.PUD_UP)
GPIO.setup(pb, GPIO.IN, GPIO.PUD_UP)
GPIO.setup(buz,GPIO.OUT)
GPIO.output(buz,False)
cap = cv2.VideoCapture(0)
time.sleep(3)
kk=0
sp=0
hb=0
fval=1
urllib.request.urlopen("https://api.thingspeak.com/update?api_key=P2IOW0NG4V31XNEU&field1=0&field2=16.4971&field3=80.4992")

try:
        while(True):

            ret, frame = cap.read()
            cv2.imshow('VIDEO', frame)
##
##        # Press 'q' to exit the camera view
##            if cv2.waitKey(1) & 0xFF == ord('q'):
##                break


            accel_x = read_raw_data(ACCEL_XOUT_H)
            accel_y = read_raw_data(ACCEL_XOUT_H + 2)
            accel_z = read_raw_data(ACCEL_XOUT_H + 4)


            # Convert raw data to g's and degrees/sec
            Ax = accel_x / 16384.0
            Ay = accel_y / 16384.0
            if(Ax>0.3 or Ax<-0.3 or Ay>0.3 or Ay<-0.3):


            sval=GPIO.input(pb)
            tval=1-GPIO.input(ts)
            print("B:" + str(sval)+ " T:" + str(tval) + " F:" + str(fval))


            received_data = (str)(ser.readline())                   #read NMEA string received
            GPGGA_data_available = received_data.find(gpgga_info)   #check for NMEA GPGGA string
            if(kk==0):
                lat_in_degrees=0
                lat_in_degrees=0
            if (GPGGA_data_available>0):
                kk=1
                GPGGA_buffer = received_data.split("$GPGGA,",1)[1]  #store data coming after "$GPGGA," string
                NMEA_buff = (GPGGA_buffer.split(','))               #store comma separated data in buffer
                GPS_Info()                                          #get time, latitude, longitude
                map_link = 'http://maps.google.com/?q=' + str(lat_in_degrees) + ',' + str(long_in_degrees)    #create link to plot location on Google map
                lat_in_degrees=16.4971
                long_in_degrees=80.4992

                print("lat in degrees:", lat_in_degrees," long in degree: ", long_in_degrees, '\n')
                print()
            map_link = 'http://maps.google.com/?q=' + str(16.4971) + ',' + str(80.4992)    #create link to plot location on Google map
            print(map_link)

            if(sval==0 or tval==0 or fval==0):
                    print("In danger")
                    GPIO.output(buz,True)
                    ii=0


                    try:
                      urllib.request.urlopen("https://api.thingspeak.com/update?api_key=P2IOW0NG4V31XNEU&field1=1&field2=16.4971&field3=80.4992")
                    except:
                      print('Check Internet connection')
                    bot.sendMessage(chat_id, 'Person is in danger at '+map_link)
                    cv2.imwrite('image.jpg',frame)
                    cv2.waitKey(1)
                    capture()

                    duration = 5  # Recording duration in seconds
                    audio_filename = 'recorded_audio.wav'

                    record_audio(duration, audio_filename)
                    send_audio_to_telegram(BOT_TOKEN, CHAT_ID, audio_filename)

                    # Remove the temporary audio file
                    os.remove(audio_filename)
                    send_sms()
```

```
except KeyboardInterrupt:
    webbrowser.open(map_link)        #open current position information in google map
    sys.exit(0)
```

Prototype:




Womenandchaild_bot
bot
recorded_audio.wav
Unknown artist
0:00 / -:--
20:34
BOT STARTED 20:35
BOT STARTED 21:15
Person is in danger at http://maps.google.com/?q=16.4971,80.4992
16°29'49.6"N 80°29'57.1"E
Find local businesses, view maps and get driving directions in Google Maps.
21:15
21:15
recorded_audio.wav
Unknown artist
0:00 / -:--
21:16
BOT STARTED 21:17
Message